

What we claim is:

1. A method of correcting a measurement of a sample, comprising:
 - a) determining a variation of a component of several measurements of a reference, wherein the reference measurement component variation does not substantially rely on changes in the reference;
 - b) determining a similar sample variation of components of measurements of samples that are similar to the measurement of the sample;
 - c) determining whether the reference measurement variation is similar to the similar sample measurement variation; and, if so;
 - d) adjusting the measurement of the sample by correcting for the portion of the component corresponding to the similar sample variation that corresponds to the reference measurement variation.
2. A method according to Claim 1, wherein the component of several measurements of a reference comprises a component of several spectral measurements of a reference.
3. A method according to Claim 1, wherein the component of several measurements of a reference comprises a sensor output.
4. A method according to Claim 1, wherein the component of several measurements of a reference comprises a combination of a sensor output and a component of several spectral measurements of a reference.
5. A method according to Claim 1, wherein the components of measurements of samples comprise spectral data at a specific wavelength.
6. A method according to Claim 1, wherein the components of measurements of samples comprise combinations of spectral data at specific wavelengths.
7. A method according to Claim 1, wherein the components of measurements of samples comprise a physical property of a sample.
8. A method according to Claim 1, wherein the component of several measurements of a reference comprises a physical property of the reference.
9. A method according to Claim 1, wherein the component of several measurements of a reference comprises a property of the measurement environment.
10. A method according to Claim 1, wherein the component of several measurements of a reference comprises a measurable characteristic of spectral data.
11. A method according to Claim 1, wherein the components of measurements of samples comprise a measurable characteristic of spectral data.
12. A method of correcting a measurement of a sample taken with a measurement device, comprising:

- a) determining a reference variation of a component of a measurement of a reference;
- b) identifying similarity components of a number of measurements of samples similar to the sample performed with the measurement device that vary in similar fashion to the reference variation; and
- 5 c) correcting the measurement of the sample by adjusting the similarity components in the sample measurement.

13. A method of correcting a measurement of a sample, comprising:

- a) determining a reference component variation of a component of several measurements of a reference, wherein the reference component variation does not substantially rely on changes in
10 the reference;
- b) determining a similar subject variation of components of measurements of subjects that are similar to the measurement of the sample;
- c) determining whether the reference component variation is similar to the similar subject component variation; and, if so
- 15 d) adjusting the measurement of the sample by ignoring the component corresponding to the similar subject variation that corresponds to the reference variation.

14. A method according to Claim 13, wherein ignoring the component comprises identifying the component as not to be used in subsequent use of the sample measurement.

15. A method according to Claim 13, wherein ignoring the component comprises communicating the
20 component such that subsequent use of the sample measurement is substantially insensitive to the component.

16. A method of adjusting a measurement of a subject system taken under a subject measurement conditions, comprising:

- a) providing a set of reference measurements captured under a first plurality of measurement
25 conditions including the subject measurement condition;
- b) providing a set of similar system measurements taken under a second plurality of measurement conditions using systems having responses similar to the subject system, the set of similar measurements including the subject system measurement;
- c) determining a set of reference measurement components of the reference measurements that
30 change independently of changes in the reference;
- d) determining a set of system components of the similar system measurements that do not vary in a manner similar to the manner in which the reference measurement components vary; and
- e) determining the adjusted measurement of the subject system from the portion of the system components that correspond to the measurement of the subject system.

17. A method of determining the spectroscopic response of a system from a first spectrum determined under a first set of measurement conditions, comprising:
- a) accessing data related to a plurality of reference spectra captured under a plurality of measurement conditions by measurement of a reference;
 - 5 b) determining one or more reference spectra components of variation in the reference spectra that do not correspond to variation in the reference;
 - c) determining a predicted change for the first spectrum from the reference spectra changes; and
 - d) determining the spectroscopic response by adjusting the first spectrum to reduce the contribution of the predicted change.
- 10 18. A method according to Claim 1, wherein the similar samples are the sample.
19. A method according to Claim 12, wherein the similar samples are the sample.
20. A method according to Claim 16, wherein the similar systems are the subject system.
21. A method of making a measurement using a measurement device, comprising:
- 15 a) storing a plurality of reference spectra of a reference system with a known spectroscopic response captured using the measurement device in a first corresponding plurality of measurement conditions;
 - b) separating the plurality of reference spectra into environment components that vary with the measurement conditions and system components that do not vary with the measurement conditions;
 - 20 c) storing a plurality of sample spectra of sample systems captured using the measurement device in a second plurality of measurement conditions comparable to the first plurality of measurement conditions;
 - d) observing components of the plurality of sample spectra that relate to the environment components; and
 - 25 e) using the related components to make a measurement with the measurement device.
22. A method of correcting a measurement of a sample using a collection of measurements of a reference and a collection of measurements of subjects similar to the sample, the collection of reference measurements corresponding in time to the collection of subject measurements, the method comprising:
- 30 a) organizing the collection of reference measurements into a first matrix and the collection of subject measurements into a second matrix, the first and second matrices being organized so that measurements in the first matrix correspond in time with measurements of the second matrix;
 - b) determining the first matrix components of measurement variation from their first matrix measurement effects;

- c) estimating a present reference spectrum element from the present reference measurement and the first matrix measurement effects of the components of variation;
 - d) determining a present measurement artifact element as the product of the present reference spectrum element transposed, the generalized inverse of the matrix of components of measurement variation of the first matrix, and the second matrix; and
 - e) subtracting an aspect of the present measurement artifact element from the measurement of the sample.
23. A method of claim 22 wherein the first matrix measurement effects of components of variation are known from other measurements.
24. A method of claim 22 wherein the first matrix measurement effects of components of variation are determined by decomposition of some or all of the first matrix into components of variation and measurement effects.
25. A method of claim 24 wherein the first matrix is decomposed using singular value decomposition.
26. A method of claim 24 wherein the first matrix is decomposed using principal components analysis.
27. A method of claim 24 wherein the first matrix is decomposed using wavelet transforms.
28. a method of claim 24 wherein the first matrix is decomposed using fourier transforms.
29. A method of adjusting a measurement of a sample, comprising:
- a) Determining a change in a reference measurement, wherein the change is due to a cause;
 - b) Determining a projected effect of the cause on the measurement of a sample;
 - c) Adjusting the measurement of a sample to reduce the projected effect's contribution to the adjusted measurement.
30. A method according to Claim 1, wherein the sample comprises human tissue.